HIGH - PRC

NUMBER OF LANES

Evaluation Criteria – Number of I-15 lane and shoulder miles added or improved, by type and level of improvement.

Edit Facts

Lanes and Shoulders:

- 4 foot shoulder: 0.51 miles
- 6 foot shoulder: 0.18 miles
- 8 foot shoulder: 0.00 miles
- 10 foot shoulder: 0.00 miles
- 12 foot shoulder: 95.39 miles
- Auxiliary Lane: 20.37 miles
- 11 foot GP Lane: 41.50 miles
- 12 foot GP Lane: 161.3 miles
- HOV Lane: 42.45 miles
- 4 foot buffer: 42.31 miles
- <4 foot buffer: 0.14 miles

Lane Miles:

- Shoulder: 95.65 lane miles (12 feet by 1 mile)
- Travel Lanes: 258.61 lane miles (12 feet by 1 mile)

Additional Information:

- None

Edit Significant Strengths

- The Proposal provides 266 miles of new or improved mainline lanes. (total of Auxiliary, GP and HOV lanes)
- The Proposal provides the Full build-out of the Ultimate Infrastructure Configuration width.
- The Proposal provides full build-out of the mainline to meet 2030 traffic demand between Provo Center Street and US6 including:
  - Completion of the full extent of the currently planned Express Lane system
  - Providing full width shoulders and full vertical clearance through replacement of the following mainline and overcrossing structures; (no shoulder or vertical clearance deviations required)
    - Replaces bridges at Provo 920S; 600S; Spanish Fork 2700N (over I-15); UPRR; UTA; Spanish Fork Main Street
    - Replaces box culvert at Hobble Creek
  - Eliminating the need for a second phase of construction to provide the I-15 roadway defined under the current FEIS/ROD and 404 permit

Minor Strengths

- The proposal provides an I-15 NB auxiliary lane between SR 75 and University Avenue. The addition of this auxiliary lane will improve the 2030 peak hour level of service from D to C for the 4 NB GP lanes adjacent to this auxiliary lane.
- The proposal adds one I-15 mainline lane and full shoulders in each direction from US6 through the Spanish Fork 6800 South structure. This requires the replacement of mainline and overcrossing bridges at Spanish Fork 300 West, Spanish Fork Main Street and the US 6 interchange and the widening of the Northbound bridge over the Spanish Fork UPRR Spur and the northbound bridge over 6800 South.
- The proposal provides the pavement width needed to provide the ultimate future lanes from American Fork Main Street through Lehi Main Street. This will simplify the extension of I-15 improvements to the north under the current FEIS/ROD

Minor Weaknesses

- The shoulder width provided with this proposal does not provide the required stopping sight distance on the mainline due to the median pier at the US 6 bridge crossing over I-15.

Significant Weaknesses

NUMBER OF INTERCHANGES

Evaluation Criteria – Number of interchanges reconstructed or improved and level of improvement.

Edit Facts

Number of Interchanges Reconstructed or Improved:

- Reconstructed: 8
- Improved: 6

Reconstructed: (8)

Edit Significant Strengths

- Lehi Main Street I/C: The proposal builds-out the I/C to a SPUI
- Provo Center Street I/C:
  - Free flow for major movements;
  - Traffic traveling westbound on Provo Center Street to northbound I-15 on-ramp does not need to

Minor Strengths

- Provo Center Street I/C:
  - Draper Lane access to local street network exceeds the RFP requirement
  - Provides good

Minor Weaknesses

- University Parkway I/C and Sandhill Road I/S complex:
  - Counter Flow I/S is not consistent with driver expectancy; high number of relatively inexperienced or in frequent users due to proximity

Significant Weaknesses

1. Lehi Main Str
2. AF 500 East
3. 1600 North
4. 800 North
5. Orem Center
6. Provo Center
7. US-6
8. SF Main

Improved: (6)

1. AF Main
2. PG Blvd
3. University Parkway
4. University Ave
5. North Springville
6. South Springville

SEE ATTACHED PDF FOR MORE INFORMATION (related to above)

Additional Information:

travel through a "cross over" and traffic traveling from the I-15 southbound off ramp traffic to eastbound Provo Center Street only needs to travel through 1 "Cross over".

- US6 I/C:
  - Reconstructed
  - Direct ramp movement from I-15 NB to US6 EB (braided ramp with Spanish Fork Main Street on-ramp to I-15 NB)
- Spanish Fork Main Street I/C: Reconstructed

storage for Provo Center Street WB traffic at signal with 1600W

to UVU and BYU
  - Substandard shoulder on I-15 SB off-ramp
- Provo Center Street I/C:
  - Design exception for reduced speed on Provo Center Street (to 30mph) is required in the proposal
  - Minor movements traffic traveling eastbound on Provo Center Street to northbound I-15 on-ramp and traffic traveling from the I-15 nouthbound off ramp to westbound Provo Center Street must travel through 3 "cross overs" .
  - High number of lane decisions required to negotiate, or get 'caught' in the rotary;

OPERATIONAL METRICS OF MAINLINE

Evaluation Criteria - Operational metrics of mainline, at and between interchanges.

Edit	Facts	Edit	Significant Strengths	Minor Strengths	Minor Weaknesses	Significant Weaknesses
	Note: The following summary assumes that SB I-15 from Orem Center St to University Parkway has 5 lanes as in the originally submitted proposal. **AM Peak** LOS C or better: 46 segments LOS D: 4 segments LOS E/F: 0 segments **PM Peak** LOS C or better: 33 segments LOS D: 17 segments LOS E: 0 segments Changes if SB I-15 from Orem Center St to University Parkway has 6 lanes: AM Peak: No change in number of segments in three LOS classifications PM Peak: LOS C or better: 34 segments; LOS D: 16 segments; LOS E/F: 0 segments **For the 18 segments on which differences exist in number of lanes among the three proposals:** **AM Peak** LOS C or better, 17 segments LOS D, 1 segments LOS E/F, 0 segments **PM Peak** LOS C or better, 13 segments LOS D, 5 segments LOS E/F, 0 segments **Within the UIC** Northbound Auxiliary lane between 1600 North and PG Blvd LOS D Southbound Transition at the northern terminus LOS C		1. Proposer provided 2030 LOS D or better for full build out of UIC. 2. Proposer provided 2030 LOS D or better outside the UIC, south to Spanish Fork.	46 out of 50 segments, LOS C or better in AM peak. 33 out of 50 segments, LOC C or better in PM peak. Transition at northern terminus - LOS C. Between ramps at US6 interchange - LOS A. Between ramps and SR77 - LOS B. Between ramps at University Avenue - LOS C. South of US 6 - LOS C.		

Auxiliary lane between Orem Center and University Parkway
LOS D

South of the UIC

Northbound

Between ramps at US-6 interchange
LOS A

Between ramps at SR-77
LOS B

Between ramps at University Avenue
LOS C

Southbound

Between ramps at SR-75
LOS D

South of the US-6 Exit
LOS C until the terminus where it's LOS C

Transition Travel times

2030 Southern Terminus from SR-77 to South of 300 Wes
3.32 minutes

2020 Northern Terminus from 100 West SF to 300 N Lehi
2.73 minutes

OPERATIONAL METRICS OF TRANSITIONS

Evaluation Criteria – Operational metrics of mainline transitions to existing facilities.

Edit Facts

- LL 01 5th SB GP lane is developed early at Lehi SB off ramp and runs across a widened Lehi Main St structure.
- LL 02 A third lane is added both NB and SB from just south of SF 6800 S to just north of SF 400 N (a distance of 4,500 ft)
- LNS -A new 4 lane bridge and crossing is provided at 2700 N. Transitions to the existing 2 lane section are provided on both ends of the 4 lane section.
- LNS The SB lanes do not apprear to have been developed correctly at Lehi Main Street. Two additional lanes are added within 375 feet of the off ramp gore. (The mainline goes from 3 GP to 5 GP in 375 feet.)

==========

Traffic Group Input:

1. Northern Terminus
    1. 2020 AM LOS
        1. Lehi Main Street/SPUI = B
        2. Mainline: LOS A-C
    2. 2020 PM LOS
        1. Lehi Main Street/SPUI = C
        2. Mainline

Edit Significant Strengths

Minor Strengths

- Northern terminus contains logical and smooth lane transitions
    - Lehi Main Street I/C improvements for 2030 traffic demands will allow mainline transitions to function longer
    - NB lanes are dropped at ramps
    - Northern terminus: Mainline LOS A-C in AM.
- Southern Terminus contains logical and smooth lane transitions
    - US6 I/C improvements for 2030 traffic demands will allow mainline transtions to function longer
    - SB lanes are dropped at ramps
    - Southern terminus: Mainline LOS A-C in AM. LOS A-C in PM.

Minor Weaknesses

- The I-15 SB Express lane terminates into a GP Lane to the north of US6 which then ends by merging left to the existing GP lane. There is a long distance between the end of the express lane and the lane drop, which encourages GP drivers to merge left into the new GP lane, and then need to merge right when the lane ends.

Significant Weaknesses

1. NB structure = D
2. SB = D

2. Southern Terminus
    1. 2020 AM LOS
        1. Mainline operates at LOS A-C
    2. 2020 PM LOS
        1. NB = C
        2. SB LOS A-C with one movement at D (SB 2 lane segment south of SF Main)

==========

REGIONAL MOBILITY - TDM

Evaluation Criteria

Level of improvement to regional mobility associated with mainline improvements using the results from the TDM, as listed below:

- VMT
- VHT
- Average speed
- Total delay
- User costs
- Percent VMT with V/C greater than or equal to 1 (for all links excluding centroid connectors)

Edit Facts

MOE's Reported by PRC

AM Period

Measure	PRC Build	No Build	Change	%Change
Percent VMT with V/C >= 1	8.8%	11.3%	-2.5%	-22.1%
VMT	2,722,180	2,677,268	44,912	1.7%
VHT	73,806	76,851	-3,045	-4.0%
Speed (mph)	36.9	34.8	2.1	6.0%
Delay (Hr)	17,196	20,462	-3,266	-16.0%

PM Period

Measure	PRC Build	No Build	Change	%Change
Percent VMT with V/C >= 1	8.6%	21.0%	-12.4%	-59.0%
VMT	3,698,841	3,606,679	92,162	2.6%
VHT	100,835	112,090	-11,255	-10.0%
Speed (mph)	36.7	32.2	4.5	14.0%
Delay (Hr)	20,964	32,273	-11,309	-35.0%

Note: These MOE's were able to be re-created by the evaluation team. Therefore, no modifications were made to the base WFRC/MAG model. Only changes to the master network file needed to be verified.

Discrepancies Between Master Network and Instructions

1. I-15 was not supposed to be changed south of Spanish Fork 400 North; however, the design files show proposed I-15 widening south of 400 North to 100 South. Therefore, the "discrepancy" is not valid.

Discrepancies Between Master Network and Design Files

1. SF Main SB On-Ramp is 2-lanes in design and 1-lane in model (low volume area).
2. SF Main NB On-Ramp is 2-lanes in design and 1-lane in model, but the design transitions to 1-lane before merge (med-low volume ramp).
3. SF Main Street under I-15 is 3 lanes each direction in design and 2 lanes in the model (med-high volume area).
4. SR-6 is 3 lanes each direction to Chappel in design and 2 lanes in the model (high volume area).
5. Widening of 2700 North, which is just a bridge over I-15, for a short distance each way from 2 lanes to 4 lanes is not included in the model (low volume area).
6. University Avenue Interchange – 2 NB On-Ramps (1 from 1800 N and 1 from Univ Ave) merge into 1 lane in the model while the design has the two 1 lane ramps run into a 2-lane link that then

Edit Significant Strengths

1. The ultimate 2030 facility significantly improves regional traffic condition variables over the No Build condition, particularly in the PM peak period, the heaviest of the two peak periods.

Minor Strengths

1. This proposer provides additional I-15 widening 2 miles south of Spanish Fork. This has minor positive implications to the Spanish Fork area because of additional I-15 capacity which attracts traffic from local streets to the Benjamin interchange, which has excess capacity.

Minor Weaknesses

Significant Weaknesses

merges onto the freeway (medium volume ramp). Also the acceleration lane was not included in the model.
7. Provo Center Street Interchange – the SB On-Ramp is 2 lanes for approximately 156 feet in the model but measures 850 feet in the design (Low Volume).
8. Provo Center is 3-lanes each direction just west of 900 West in the design, but only 2-lanes in the model (high volume area).
9. University Parkway NB Off-Ramp - deceleration lane is 3400 ft long in the model but only 1500 ft in the design.
10. University Parkway WB-to-SB storage lanes are not in the model (high volume area).
11. Orem Center Street WB between 1200 West and the Interchange is 4 lanes in the design and 2 lanes in the model (high volume area).
12. 1600 North NB On-Ramp acceleration lane is 1153 ft in the model and only around 800 ft in design. Both the NB acceleration lane and the SB deceleration lane are carried nearly to 200 South in the model and the design shows them ending/beginning about 800 ft south of 200 South.
13. AF 500 East NB On-ramp has a 6 lane section for 1554 ft in the model which is long compared to the design file (800 ft).
14. Lehi Main SPUI has some ramps coded as 1-lane and the design shows 2-lanes (med-low volume area).
15. The NB I-15 transition from 4 lanes to 3 at Lehi Main is about 700 ft in the design and 1200 ft in the model.

Impact of Discrepancies

The net impact of discrepancies from the Instructions and the Design Files would be **slightly positive to the MOE's** reported (i.e. the reported values are slightly worse than they would be if the discepancies were corrected). With the exception of the Percent VMT with V/C >=1, **all MOE's are within 2% of the reported value.** The attached spreadsheet provides details.

==========

LAP

[From required regional mobility narrative, general]:

1. Maximizing regional mobility an important factor in project development.
2. Providing additional ATMS elements along parallel routes.
3. Considered impact of other operational improvements to regional mobility (e.g. decision points, length of weaving areas, cross street transitions, bike/ped conflicts).
4. Acknowledgment of importance and priority of regional mobility as a UDOT goal.

[From required regional mobility narrative, mainline]

1. Full EIS buildout American Fork Main to Spanish Fork Main.
2. Providing 4 GP and 1 Express lane in each direction South of Provo Center Street considered as most important regional mobility improvement outsid of UIC.
3. Improvements along mainline in area of Provo Center Street and Spanish Fork Main Street.
4. North Terminus: improvements provide LOS D well beyond 2030 when improvements North of project limits are completed by others; widening the bridge over Lehi Main to accomodate six lanes.
5. South Terminus: Proceeding 2 miles South of US6; transition will operate at LOS C in 2020, LOS D in 2030.
6. Reserve capacity for Southbound mainline segments outside the North and South terminus areas.

==========

REGIONAL MOBILITY - VISSM

Evaluation Criteria

Level of improvement of the interchange operations using the results from the VISSIM models as listed below:

- Delay
- Speed
- Density
- Travel time index
- Queuing

Edit	Facts	CompositeNew	Edit	Significant Strengths	Minor Strengths	Minor Weaknesses	Significant Weaknesses

==========

LAP

Error Occurred

[From required regional mobility narrative, interchanges]:

1. Complete reconstruction and reconfiguration of existing diamond at Lehi Main into SPUI.
2. Complete reconstruction and reconfiguration of the existing interchanges at the US6 and Spanish Fork Main area with "enhanced" AJR configuration. By adding a third lane to the Southbound off ramp and other geometric modifications, significantly improve traffic conditions in the area.
3. For every interchange from Lehi Main to Spanish Fork, providing designs that result in a level of service that meets or exceeds requirements.
4. Provo Center Street rotary interchange. Provides free-flow movement at the I-15 ramps. LOS A in 2030. Density in weaving areas LOS C. Benefits of rotary interchange include: level of service, impact to public during construction, improved connection from Independence Ave to Center Street, and allows center street to remain open during construction.

==========

Northern Terminus - Lehi Main Street (Proposed SPUI - Lehi, Existing DDI - AF)

1) Design vs. Model
a. According to the design plans there should be a third lane WB that starts either to the east or is created at link 152.
b. SB onramp from AF mainstreet should drop the second lane at between 1150 and 1300, but VISSIM shows it dropping it at 1400 feet.
c. Design plans for NB off ramp to Lehi Main shows a 1200 feet decel lane. VISSIM shows no decel lane.
d. Design plans for SB off ramp to Lehi Main shows a 1200 feet decel lane. VISSIM shows no decel lane.
2) Requirements not met
a. Missing pedestrian crosswalk on north side at the intersection of Lehi Main and N 850 E
b. The off-ramps from I-15 to Lehi Main Street do not have decelerations lanes
c. At AF Main Street DDI, the left turns from I-15 Off ramps are connected with the leftmost lanes. They are connected to the middle two lanes. If this is indeed the case, the design plans have to be checked against the model
d. PRC reports LOS 'D' or better on all mainline segments of I-15. However, LOS 'E' was determined (runs conducted during review) for the following three segments on I-15
i) I-15 NB North of Lehi Main
ii) I-15 SB North of Lehi Main
iii) I-15 SB Diverge to Lehi Main AM peak hour MOEs (Year 2020)
3) Intersection LOS C or better
a) Ramp terminal movements: 9 of 12
b) Intersections: 2 of 3
4) Travel time
a) NB-EB = 100.14 Seconds
b) NB-WB = 137.7 Seconds
5) Mainline LOS
i) I-15 NB South of AF Main – Basic D
ii) I-15 NB Diverge to AF Main – Diverge C
iii) I-15 NB At AF Main – Basic C
iv) I-15 NB Merge from AF Main – Merge B
v) I-15 NB between AF Main and Lehi Main – Basic C
vi) I-15 NB Diverge to Lehi Main – Diverge B
vii) I-15 NB At Lehi Main – Basic D
viii) I-15 NB From Lehi Main –Merge D
ix) I-15 NB North of Lehi Main **E** (This LOS is based on CORE analysis – Reported D by PRC)
6) Travel Time Index = 1.16

American Fork 500 East (Proposed - DDI)

1) Design vs. Model
a. SB onramp from AF mainstreet should drop the second lane at between 1150 and 1300, but VISSIM shows it dropping it at 1400 feet.
b. NB onramp accel lane from AF 500 E should be 1000 feet at maximum according to the design plans, however VISSIM shows 1200 feet.
c. SB AF 500 E should only have one lane through the intersection with 1000 South. This may

Northern Terminus - Lehi Main

1. The increased spacing of signalized intersections associated with the SPUI, along with the reducing of number of intersections along Main Street will provide significantly better operations in a currently congested area.
2. 2030 LOS D or better exceeds the contract requirements.

Provo Center Street

1. Rotary interchange provides free flow movements for important trips in this area, such as to connectivity between North and downtown Provo.
2. Exceeds Level of Service requirement for 2030 conditions.

Northern Terminus - Lehi Main

- The travel time to/from I-15 are relatively good compared to freeflow travel for 2020.

800 N Orem

- Proposed SPUI reduces signalized intersection density along 800N which facilitates signal coordination and enhances queue storage in this primary route.

Orem Center Street

- Proposed SPUI reduces signalized intersection density along Center Street which facilitates signal coordination and enhances queue storage in this primary route.

Orem - University Parkway

- Weaving from the northbound I-15 off ramp to the eastbound left turn lane to the UVU campus has been controlled with signals on University Parkway. This improves an existing condition that is a source of major congestion in this area.

Provo Center Street

- Free-flow conditions for all traffic movements.

US-6 Spanish Fork

- Accomodates 2030 traffic demand
- Westbound US 6 to SB 15 approach is an improvement over existing conditions.
- NB braided ramp eliminates weaving on the ramps, and allows for free flow over Spanish Fork Main Street.

Orem - University Parkway

- Queuing and storage conditions associated with the interaction of the SPUI and the CFI are, in a number of cases, borderline operations close to a LOS E/F condition.
- CFI operations immediately adjacent to a freeway interchange is an unconventional approach. It will therefore require close examination of signing and other driver expectancy items. These conditions impact capacity as drivers reduce their speeds to less than optimal to navigate unfamiliar movements.

Provo Center Street

- Southbound I-15 to Westbound Center Street requires additional travel time over a conventional interchange.
- The unconventional nature of this interchange, unusual signing and other driver expectancy elements, will have an impact on operations and speeds will be reduced within the interchange.

again be a case of something that will be constructed by other contractors in the future.

AM peak hour MOEs (Year 2030)
2) Intersection LOS C or better
b. Ramp terminal movements: 12 of 12
c. Intersections: 4 of 4
3) Travel time
a. Travel times are only reported for the mainline and not the required movements
4) Travel time index = Only reported for travel time on mainline

PM peak hour MOEs (Year 2030)
6) Intersection LOS C or better
a. Ramp terminal movements: 9 of 12
b. Intersections: 4 of 4
7) Travel time index = Only reported for travel time on mainline

Orem 1600 North (Proposed DDI - VISSIM not required)

Orem 800 North (Proposed SPUI – VISSIM not provided)

Orem Center Street (Proposed SPUI – VISSIM Model not required)

Orem University Parkway (Proposed SPUI with a CFI at Sandhill Rd.)

1) Design vs. Model: no discrepancies
2) Interesting Facts
a. Missing pedestrian crosswalks on the east and west side of the intersection of University Parkway and Sandhill road. Design plans have to be verified if these pedestrian bridges are proposed instead of at-grade crosswalks - Confirmed (not an issue)
b. Pedestrian path at the north side of University Parkway SPUI is not connected from one end to the other. Design plans have to be verified if these pedestrian bridges are proposed instead of the pedestrian
MOE related: Metrics for ramp meters are not reported, output statistics for each run are not provided

AM peak hour MOEs (Year 2020)
3) Intersection LOS C or better
a. Ramp terminal movements: 8 of 12
b. Intersections: 2 of 3
4) Travel time
a. SB-EB = 170 seconds
b. SB-WB = 133.3 seconds
c. NB-EB = 107.6 Seconds
d. NB-WB = 164 Seconds
5) Travel time index = 1.15

PM peak hour MOEs (Year 2020)
7) Intersection LOS C or better
a. Ramp terminal movements: 7 of 12
b. Intersections: 3 of 3
8) Travel time
a. SB-EB = 146.4 seconds
b. SB-WB = 162.9 seconds
c. NB-EB = 123.1 Seconds
d. NB-WB = 164.1 Seconds
9) Travel time index = 1.22

AM MOEs for CFI at Sandhill

Northbound left F
Northbound through E
Northbound right B
Southbound left E
Southbound through D
Southbound right A
Eastbound left E
Eastbound through C
Eastbound right A

Westbound left D
Westbound through B
Westbound right B
Overall D

Provo Center Street (Proposed Paper Clip Rotary)
1) Design vs. Model: No significant discrepancies

2) Requirements Not Met
a. Truck restrictions are not coded in the model
b. No priority rules or conflict areas are used in the roundabout. Vehicles entering the roundabout should yield to vehicles already in the roundabout. This is a safety concern more than an operational concern.

AM peak hour MOEs (Year 2030)
3) Intersection LOS C or better
a. Ramp terminal movements: 8 of 8 – Weave analysis for Rotary
b. Intersections: 3 of 3
4) Travel time
a. SB to EB 136.19
b. SB to WB 130.74
c. NB to EB 95.55
d. NB to WB 85.24
5) Travel time index = 1.08

PM peak hour MOEs (Year 2030)
7) Intersection LOS C or better
a. Ramp terminal movements: 8 of 8 – Weave analysis for Rotary
b. Intersections: 3 of 3

US-6/Spanish Fork Main Street (Proposed reconfiguration: 3 SB lanes to US-6 to signal for SB I-15 over SF Main St., Braided ramps NB)

1) Design vs. Model:

a. The right SB through of US-6 should end at Chappel Drive as a right turn only. VISSIM shows it coded as a third through at Chappel.
b. Minor comment but the length of link 16 should be closer to 175, VISSIM shows it coded as close to 325.
c. The design drawings do not include that there will be a SBL at Spanish Fork Main Street and 1000 North, however VISSIM has coded a left turn bay in this location.

AM peak hour MOEs (Year 2030)
2) Intersection LOS C or better
a. Ramp terminal movements: 4 of 4
b. Intersections: 3 of 4
3) Travel time index = 1.04

PM peak hour MOEs (Year 2030)
4) Intersection LOS C or better
a. Ramp terminal movements: 3 of 4
b. Intersections: 3 of 4
5) Travel time index = 1.06

Southern Terminus

Design vs. Model: There should not be a decel lane for the NB offramp to Spanish Fork (on link 83).

++

MEDIUM - PRC

OTHER OPERATIONAL IMPROVEMENTS

Evaluation Criteria – Other operational improvements including the following:

o Number and nature of decision points
o Length of weave areas
o Width and location of shoulders and refuge areas
o Number of bicycle/pedestrian conflicts with traffic o Provision of clear zones

Edit Facts

Operation Characteristics Collected:

- Number of lane changes required for movements
- Bicycle conflicts
- Ped conflicts
- Weave for ramps to mainline
- Grade separated bike/ped facilities
- Locations of non-continuous GP lanes
- Substandard Shoulders
- Non-Standard taper rates
- Full clearzone provided, length

PLEASE SEE ATTACHED FILE FOR THIS INFORMATION

Additional Information:

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Traffic Group Input:

1. One mainline weaving area exists, Type B, on NB I-15 from Orem Center St to Orem 800 N. Based on HCS analysis, the weaving area length of 2500 ft provides 2030 LOS C in both the AM and PM peaks. AM peak density: 22.4 pc/mi/ln; PM peak density: 27.6 pc/mi/ln.

==========

Edit Significant Strengths

- New Provo 500 W grade separation crossing reconnects Provo communities and fulfills EIS commitment
- Extensive deployment of ATMS improvements to regional arterials during MOT phase with sensors, detectors, signs, and messaging will be utilized after construction to improve operations on mainline and interchanges.
- Regional trail access through the Provo Center Steet Interchange is simple and has minimal conflict points with high volume roadways

Minor Strengths

- Replacement of SF 2700N, 4 lanes
- Replacement of Hobble Creek box culvert provides capacity for 100 yr flood and will provide new habitat for the June Sucker through a formal consultation with the participating agencies.
- Pedestrian safety is improved with a grade separated pedestrian crossing under the free flowing University Parkway WB to I-15 NB on ramp.

Minor Weaknesses

- Unsignalized regional trail crossing at I/S of PCS and Independence Ave poses safety concerns
- The sidewalk on the south side of Spanish Fork Main Street does not continue across the southbound on ramp. Pedestrians may be tempted to walk along the on ramp shoulder.
- Spanish Fork Main Street I/C: The intersection has been provided on the bridge structure which is prone to icing.

Significant Weaknesses

NUMBER OF INTERSECTIONS

Evaluation Criteria – Number of intersections improved and level of improvement.

Edit Facts

Improvements to Intersections:

30 Intersections were improved:

- 30 thru lanes
- 12 left turn lanes
- 9 right turn lanes
- 10 acceleration lanes
- 13 medians
- 17 shoulders
- 26 sidewalks
- 26 improved pedestrian safety
- 27 improved ped access
- 21 improved bike safety

CompositeNew

Error Occurred

Edit Significant Strengths

- Improved 18 additional intersections by adding additional permanent turn lanes, thru lanes, acceleration lanes or shoulders, etc not required to meet LOS D with 2030 volumes:
  - Lindon 400 North and Proctor Lane
  - Orem 800 North and 1500 West

Minor Strengths

- Orem Center Street -added EB through at 1330 West
- the intersection of Sandhill Road and Univ Pkwy, provide 4 WB thru lanes
- "T" I/S with Independence Ave and Provo Center Street provides good access to local street network

Minor Weaknesses

- Curb return geometry does not allow WB University Parkway right turn onto Sandhill/College DR movement

Significant Weaknesses

SEE ATTACHED MAPS FOR MORE SPECIFICS REGARDING EACH INTERSECTION

Additional Comments:

Structures

Evaluation Criteria – Extent of bridge improvements including:

o Number of structurally deficient and/or functionally obsolete structures replaced
o Number of structures rehabilitated and/or widened
o Maintenance cost and ease of re-decking, inspection and maintenance for each structure type

Edit	Facts	CompositeNew	Edit	Significant Strengths	Minor Strengths	Minor Weaknesses	Significant Weaknesses
	From Data Miners: • Replaced - 52 • Widened - 4 (two at SR-73, RRXing, 6800 South) • Rehabilitated - 2 • New Bridges - 9 • Drainage Structures - 8 major drainage crossing structures Out of the 52 replaced: • 14 were Functionally Obsolete • 5 were Structurally Deficient **SEE ATTACHED SPREADSHEEET FOR MORE DETAILED INFORMATION** Additional information: (FKD) Bridges 201-204, 206, 208, and 209 are proposed to use spread footings. (FKD) 51 concrete girder bridges; 13 steel girder bridges (LRR) All new integral bridges critical seismic 3.1.4.2.4 (LRR) No post-tensioning, all deck replacable (MAD) Steel and PC/PS Girder Types (FKD) Per ATC #27: PRC is proposing integral abutments with finwalls for the following bridges with the following skews and span lengths: • Sam White over I-15 (BR406) skew 48.00 degrees, two-span at 179ft and 179ft • I-15 over UTA (BR214) skew 51.50 degrees, single span at 125ft • I-15 over UPRR (BR215) skew 52.50 degrees, single span at 185ft • I-15 over Geneva Road (BR403) skew 47.93 degrees, two-span at 160ft and 111ft • Lindon 200 South over I-15 (BR404) skew 49.27 degrees, two-span at 165ft and 165ft PRC is proposing a semi-integral abutment with finwalls for the following bridge with the following skew: • Provo Center Street EB over I-15 (BR206) skew 45.00 degrees at abutment #1 only. Two-span at 139ft and 133ft	Error Occurred		• Widening 4 bridges (rehabilitating 2) that extend past defined project limits. Lehi Main St Interchange to be widened and rehabilitated and two bridges south of Spanish Fork (6800 S. and UPRR Sugar Spur) will be widened. • Will design integral abutment bridges to meet critical bridge designation and will classify all semi-integral/integral bridges as essential. This will be accomplished by more refined design, increasing height of abutments and adding finwalls to all bridges. Adds increased seismic capacity to bridges. Good seismic strategy for bridge design will give the Department bridges that require minimal repairs after a seismic event. • Reconstructing US-6 interchange. • Replacing 52 existing bridges.	• Proposing to use joint less bridges on highly skewed bridges by providing additional refined structural analysis. • Use of partial depth deck panels increases worker and public safety during contruction. • Providing new bridge at 500W in Provo. • They have 52 existing bridges being replaced and 9 new bridges. 13 out of 61 bridges utilize steel girders. Therefore, 79% of the combined new and existing bridges are concrete superstructures which have the least long-term maintenance costs/requirements.	• Contractor proposes to seismic design method called "Foundation Rocking" on 2 two-span bridges. Seismic forces are dissipated by allowing the footings to "rock" or uplift. Foundation rocking of spread footings during a seismic event can lead to significant soil displacements and may require more repairs and take longer to open back up to traffic. This is not common practice at UDOT and is something of an unknown here. It is, however, allowed by AASHTO with the owner's approval and AASHTO recommends it only be used on non-essential bridges. Because it is not a common strategy we have limited experience designing and reviewing this approach. There are also concerns about inspecting these post-earthquake. Spread footings are not typically desired in higher seismic areas.	

Pavement

Evaluation Criteria – Anticipated pavement performance for each pavement type based on design output and evaluations of:

o Location and extent of each type of pavement and pavement section, including surface treatments
o Design Life o Life cycle costs

Edit	Facts	CompositeNew	Edit	Significant Strengths	Minor Strengths	Minor Weaknesses	Significant Weaknesses

Pavement Quantities:

Mainline:

- 40 year Rigid: 345.18 lane miles
- 30 year Flexible: 20.68 lane miles
- 20 year Flexible: 3.99 lane miles

Ramps:

- 40 year Rigid: 21.15 lane miles
- 30 year Flexible: 18.60 lane miles

Cross Street Pavement:

- 30 year Rigid: 5.52 lane miles
- 20 year Flexible: 46.65 lane miles

SEE ATTACHED FILE FOR MORE DETAILED INFORMATION ON ABOVE ITEMS

Additional Information:

- Mainline PCCP section consists of:
  - 12 inches PCCP
  - 3 inches ACB
  - 6 inches OGB
  - 12 inches GB

Material coefficients are higher than what is typically use in the UDOT design manual. This reduces the reliablity that is incorported to address inconsistencies in materials and/or construction processes. This could be acceptable, but verifications would be requried to assure that these materials have been tested and proven to meet a higher strength.

Error Occurred

- PRC is proposing PCCP from Lehi Main Street to Spanish Fork Main Street - (mainline, shoulders, and ramps).
- PRC is providing a 40 year design on all mainline paving
  - This design exceeds the requirements within the UIC by 10 years
  - The design also exceeds the requirements for South of Provo Center Street by 20 years
- This pavement section provides an excellent structural foundation and addresses:
  - drainage - will drain 50% of the free water in less than 2 hours
  - loss of support
  - materials durability
  - This attention to design provides for a superior performing pavement in respect to longevity and load carrying capacity.
- PRC is providing 30 year flexible pavement south of Spanish Fork Main Street for approximately 2 miles.
  - This exceeds the requirements for pavements South of Provo Center Street by 10 years.
  - PRC will utilize whitetopping where possible in order to utilize existing HMA pavement

- PRC is providing a perforated pipe drainage system under pavement. This increases the life of a pavement by removing water from the subgrade and is especially beneficial in areas with higher water tables or high seasonal water levles.
- Exisitng pavement investigation was accomplished using back-calculation of falling weigh deflectometer data to accurately represent the value of the subgrade.

LOW - PRC

INTERIM FUNCTIONALITY

Evaluation Criteria – For areas between American Fork Main Street and Provo Center Street that will be constructed to less than full build out of the UIC:

o Level of interim functionality
o Amount of rework costs and traffic impacts required to complete full build-out,
o 2020 and 2030 LOS
o The associated year that the LOS crosses the D/E threshold

Edit	Facts	Edit	Significant Strengths	Minor Strengths	Minor Weaknesses	Significant Weaknesses
			• The proposer provides the full UIC buildout.			

CROSS STREET OPERATIONAL METRICS

Evaluation Criteria – Operational metrics in cross street transitions to existing facilities

Edit	Facts	CompositeNew	Edit	Significant Strengths	Minor Strengths	Minor Weaknesses	Significant Weaknesses
	==========	Error Occurred			• Lehi Main Street, West Side: Carrying a third lane thru 850E intersection provides useful additional merging distance • Orem Center Street, West Side: Carrying two lanes thru 1330W provides more space for merging and weaving	• Orem Center Street, East Side: Carrying only two lanes thru 1200 W does not provide enough space for merging and weaving, especially since the SB off ramp feeds three lanes of traffic into this intersection. • Proposal does not include improvements that will be required west of Provo Center Street I/S with 1600W in order to implement proposed improvements on the east leg of that I/S.	

Traffic Group Input:

1. See attached spreadsheet for detailed analysis of cross street transitions.

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- Provo Center Street, West Side: Carrying two lanes thru 1600W provides more space for merging and weaving
- Orem 800N, East Side: Carrying 3 lanes thru 1200W intersection provides additional capacity

NON-MOTORIZED IMPROVEMENTS

Evaluation Criteria – Extent and functionality of non-motorized improvements.

Edit Facts

Non Motorized Improvements:

- 25.3 miles Fiber Backbone (includes some existing that will remain ???)
- 10 signalized intersections
- 2 pedestrian separated crossing
- 60,590 feet bike lane (could be striped or not striped)
- 6220 feet regional trails
- 50,720 feet sidewalk

FOR MORE DETAILED INFORMATION SEE ATTACHED FILE

Additional Information:

- None

Edit Significant Strengths

- Regional trail access through the Provo Center Steet Interchange is simple and has minimal conflict points with high volume roadways

Minor Strengths

- Provo 500W grade separaton provides pedestrian access across I-15
- Reconstruction of SF 2700N accommodates regional multi-use trail

Minor Weaknesses

- The sidewalk on the west side of Spanish Fork Main Street does not continue across the SB on ramp.

Significant Weaknesses

BEYOND DESIGN YEAR

Evaluation Criteria – Potential performance beyond the design year; reserve capacity and/or ease of future improvement.

Edit Facts

- LL 01 Providing 16'-6" min vertical clearance at all bridges where I-15 crosses over roads beginning at SF 300 W heading north. Reconstructing Provo 600 S, Provo 920 S and SF 300 W.
- LL 02 Providing full width SF 2700 N bridge (4 lanes plus multi-use path).
- LL 03 Widening Lehi Main Street bridge to accomodate widening to north.
- LL 04 Provides new Provo 500 W crossing.
- LNS-Access to 1600 West and Provo Center Street for existing properties along Draper Lane will be improved.
- LNS new bridge provided at 2700 North SF will be 4 lanes wide.

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Traffic Group Input:

Reserve Capacity

1. 2.5% projected annual growth along corridor.
2. Full buildout of UIC provides excess capacity beyond 2030.
3. 46/50 mainline segments operate at LOS C or better in the AM. (Core calculated HCS+)
4. 33/50 mainline segments operate at LOS C or better in the PM. (Core calculated HCS+)
5. Approximately 7 additional years of southbound reserve capacity from Lehi Main to AF Main, 500 E to PG Blvd, 1600 N to Orem Center St, University Pkwy to Provo Center, between University Ave ramps, and south of US 6 to terminus.
6. Approximately 7 additional years of northbound reserve capacity from the south end to SF Main St, between SR-77 ramps, SR 75 to Provo Center St., University Pkwy to Orem 1600 N, and PG Blvd to 500 E.
7. Approximately 15 additional years of northbound reserve capacity from SF Main off-ramp to the US-6 on-ramp.

Edit Significant Strengths

- Ramp layout between Spanish Fork Main Street and US6 and length of US6 crossing of I-15 will simplify addition of an additional mainline lane in each direction as may be required for traffic demand beyond 2030.
- This proposer's commitment to the Lehi Main Street/Northern Terminus area provides capacity in the transition area to 2030, 10 years beyond the 2020 requirement.

Minor Strengths

- 46/50 mainline segments operate at LOS C in the AM.
- 33/50 mainline segements operate at LOS C in the PM.
- 7 years reserve capacity in some segments.
- 15 years reserve capacity from Spanish Fork Main off-ramp to US 6 on-ramp.
- There is significant reserve capacity in the Provo Center Street I/C concept
- SPUI at Orem 800N and Orem Center Street provides reserve storage capacity between adjacent intersections.

Minor Weaknesses

Significant Weaknesses

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MAINTENANCE

Evaluation Criteria – Assessment of long term maintenance and operating costs related to the following: Snow removal and storage; Power consumption; Need for specialized maintenance equipment; Drainage system maintenance.

Edit Facts

From Data Miners:

- 369.85 lane miles of mainline pavement
- 40.75 lane miles of ramp pavement
- 52.17 lane miles of cross street pavement
- Trench drains used
- The plans do not show access to detention ponds.

SEE PAVEMENT SECTION FOR MORE DETAILS

Edit Significant Strengths

- Raising the mainline profile between UA and SR 75 reduces the risk of future flooding
- Exclusive use of concrete barrier median and roadside south to SF 400N; no W-beam or cable barrier

Minor Strengths

- Use of PCCP on all ramps will simplify future roadway maintenance
- Replacement of all culverts south of PCS (except east bay north culvert)
- Replacement of two culverts north of AFMS (Mill Pond and Mitchell's Hollow)
- Increase verticle clearance at 5 crossings, (I-15 over cross street) will decrease risk of bridge getting hit. This may decrease long term maintenance costs.
- Provide five year warranty that conforms to the terms and requirements of RFP Part 1, Section 24; Note this warranty does not cover normal wear and tear items, such as striping. Estimate that in the Department will realize aproximately $5 million value from this warranty. The unused portion of the warranty will be returned to the proposer. Commits to show amount in escrow account.

Minor Weaknesses

- Hydrodynamic oil/water separator requires unique maintenance equipment and training
- New American Fork River Bridge will require more roadway and structure maintenance than a box culvert

Significant Weaknesses